On the Air Live: 10M and 15M FT4 and FT8 for Field Day

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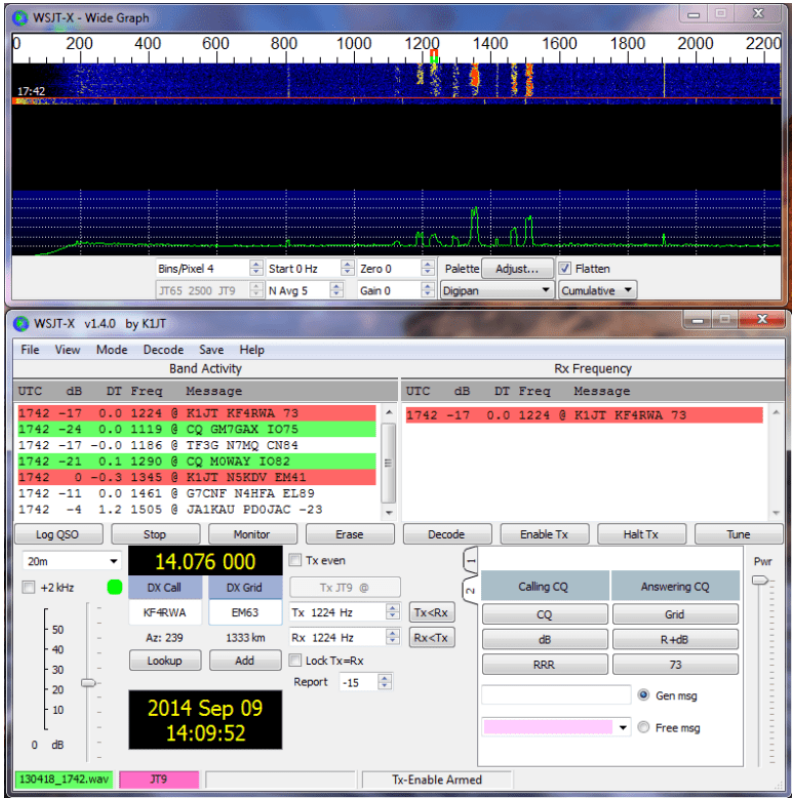
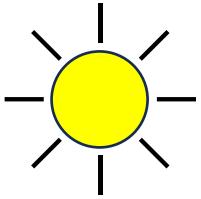
To Cover

- 10M and 15M Propagation
- Propagation Tools
- DIY Antennas
- How FT4 and FT8 Works
- Setup WSJT-X
- FT8 and FT4
- Field Day Setup

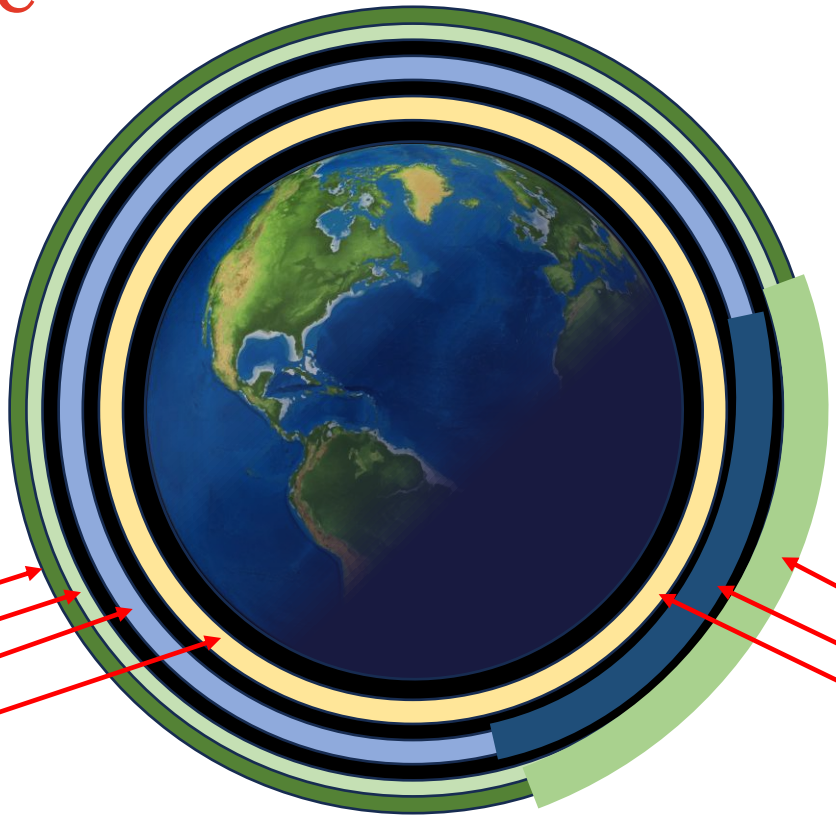


Ionosphere

F Layer: 100-240 miles



F2 layer propagates HF during the day.

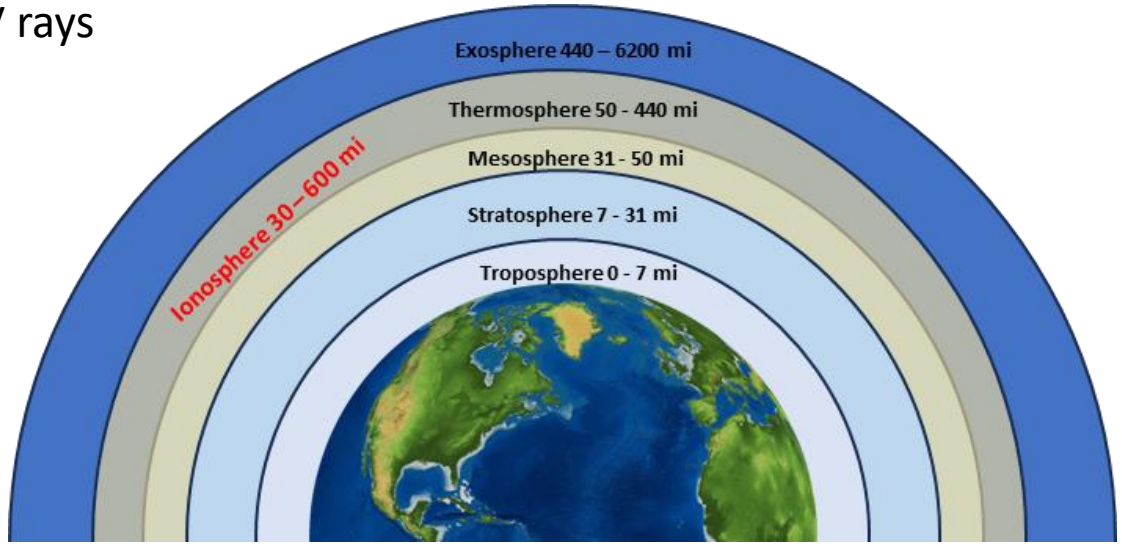


At night, F1 layer fades and merges into F2 layer.

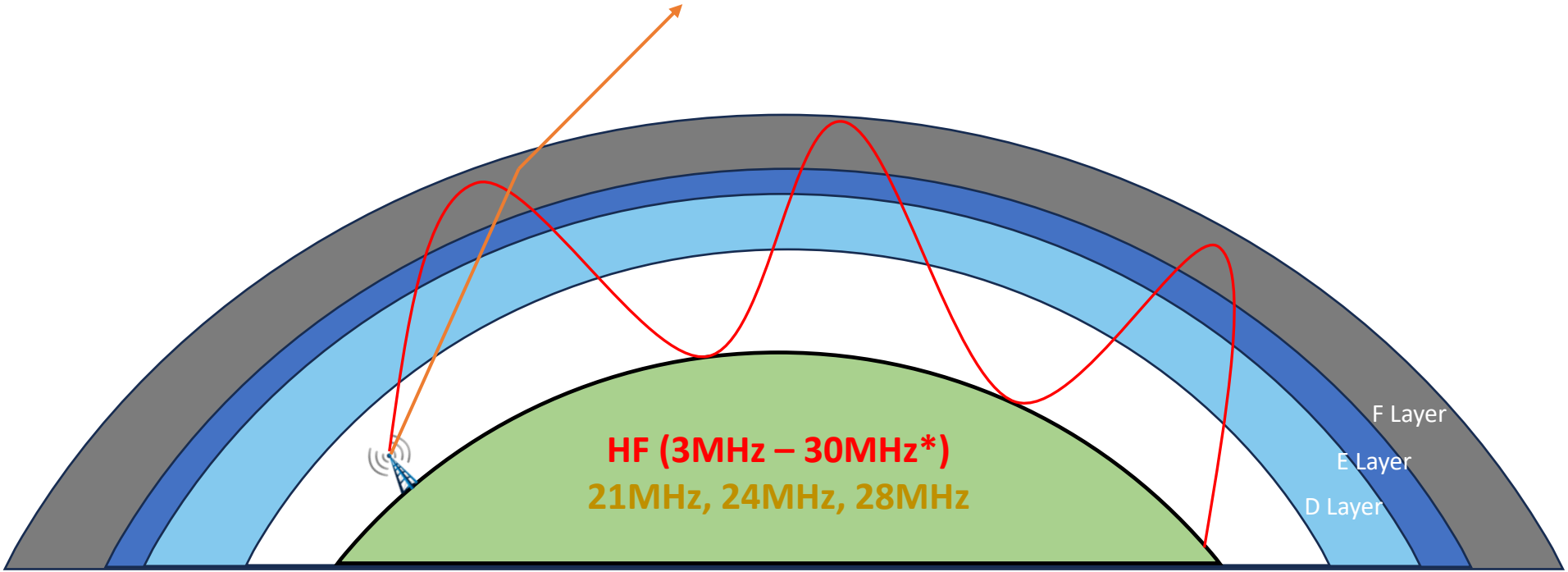
~2500 mile hops

10M and 15M Propagation

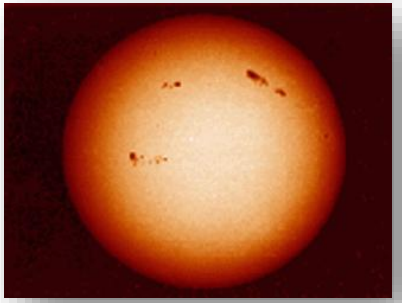
- Ionosphere:
  - Portion of atmosphere
  - Ionized by sun's UV rays

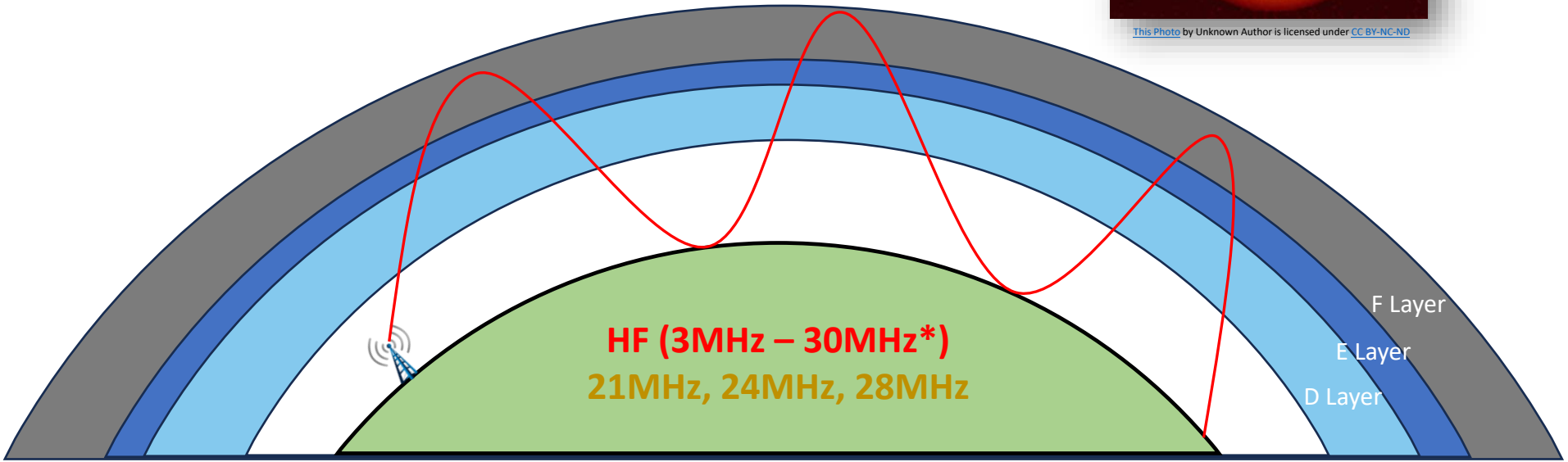


10M and 15M Propagation



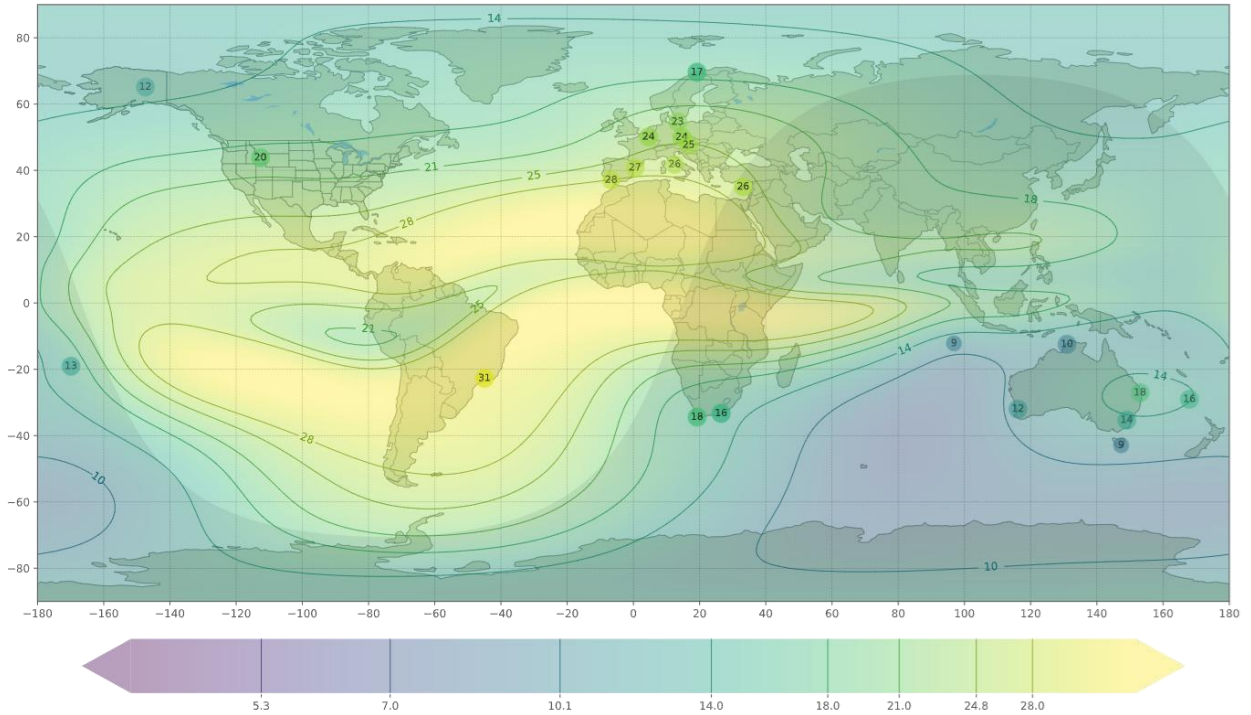
10M and 15M Propagation
High Solar Activity





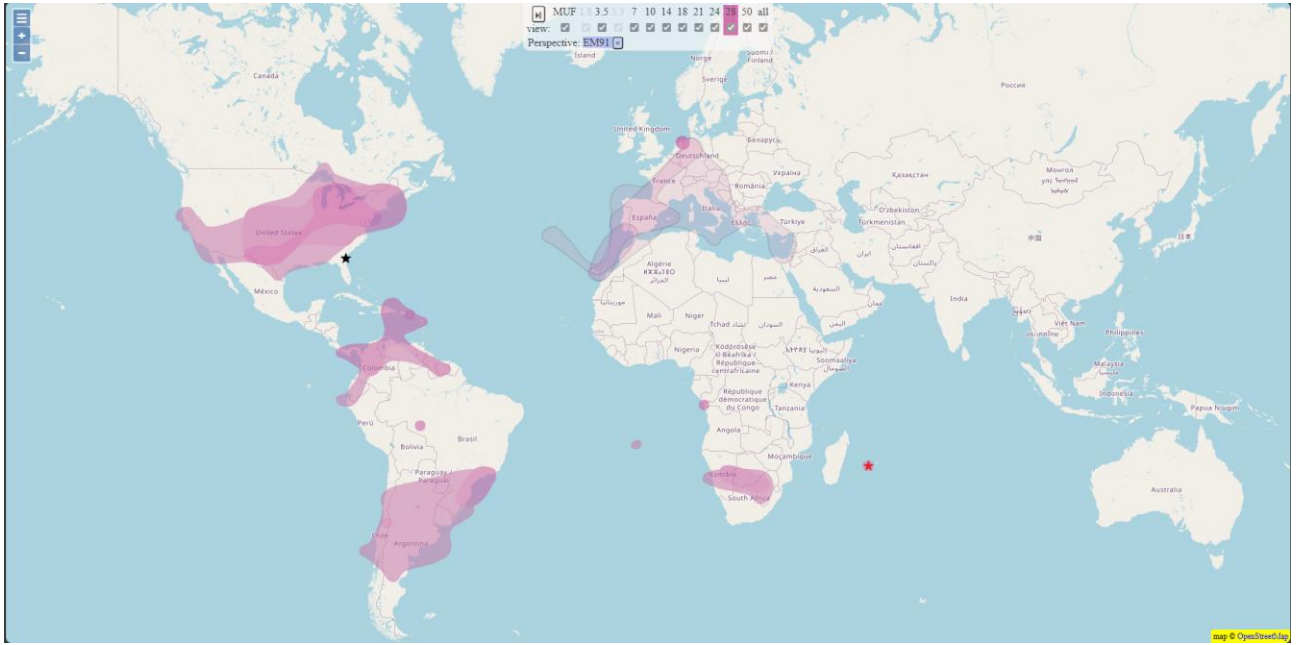
10M and 15M Propagation

- prop.kc2g.com/
- Maximum Usable Frequency
- 1310 EDT, May 21, 2025



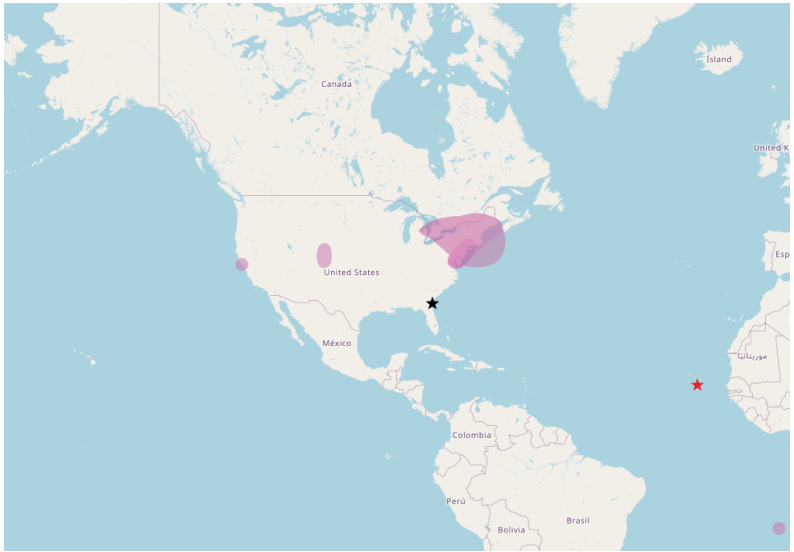
10M and 15M Propagation

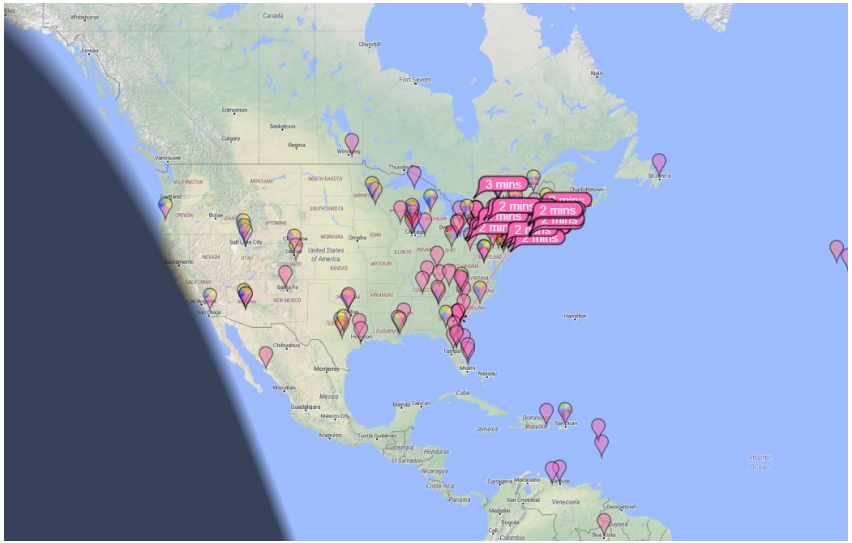
- hf.dxview.org/
- Current ham activity



10M and 15M Propagation

May 21, 2025, 0856 EDT





https://www.pskreporter.info/pskmap.html

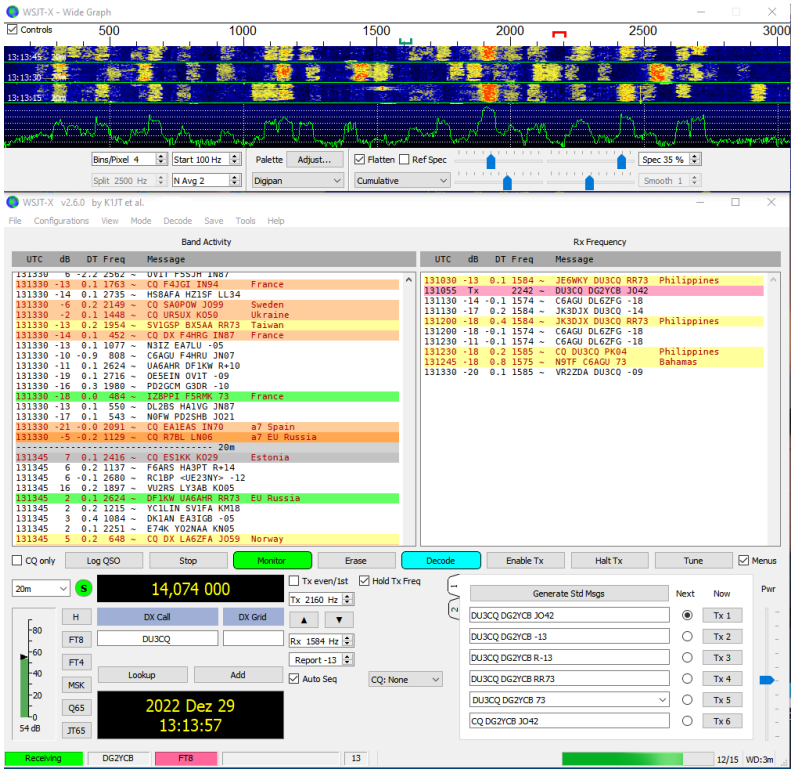
DIY 10M and 15M Antennas

- Dual banana binding post connector w/female BNC
  - Can be used to build vertical or dipole
- 18 gauge speaker wire
- Telescoping fishing rod
  - 10’ and 13’

- **λ/2 = 468/f(MHz)**
- **λ/4 = 234/f(MHz)**
- Dipole and vertical elements
- 10M: 8.3 feet/element
- 15M: 11.1 feet/element

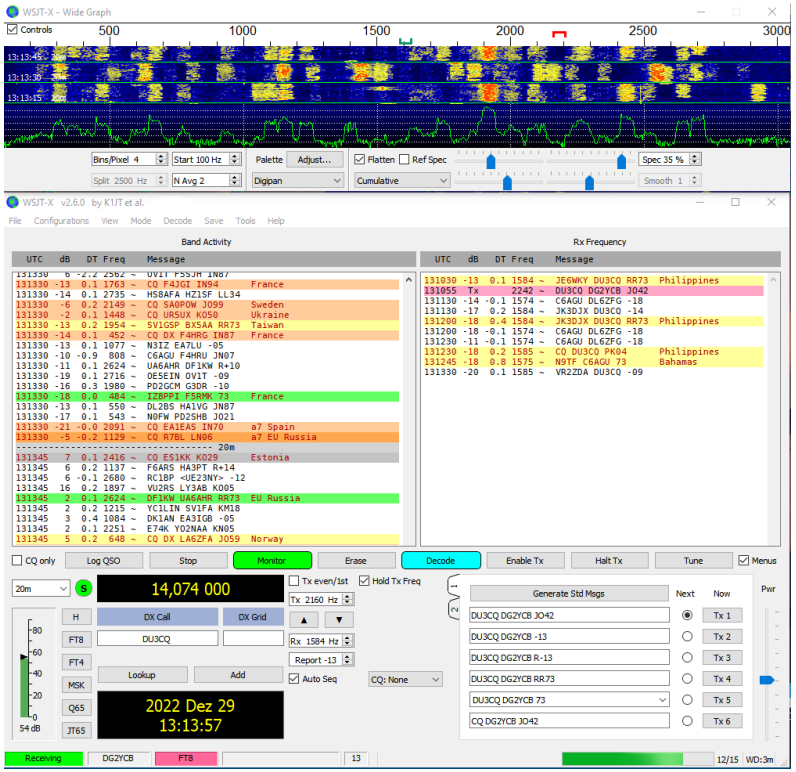
FT4 and FT8

- Sound card data mode
- Weak signal propagation
- Multiple Frequency Shift Keying
- Time dependent
  - Ensure computer's time is synchronized
  - Dimension 4, http://www.thinkman.com/dimension4/



FT4 and FT8

- FT8
  - 15 second T/R cycles
  - 50Hz bandwidth
  - Decodes possible up to -24dB
- FT4
  - 6 second T/R cycles
  - 90Hz bandwidth
  - Designed for contesting
  - Less sensitive than FT8, but -20dB is possible



WSJT-X

https://wsjt.sourceforge.io/wsjtx.html

WSJT-X

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WSJT-X
MAP65
Program Development
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Support

Description

WSJT-X implements communication protocols or "modes" called **FST4, FST4W, FT4, FT8, JT4, JT9, JT65, Q65, MSK144**, and **WSPR**, as well as one called **Echo** for detecting and measuring your own radio signals reflected from the Moon. These modes were designed for making reliable, confirmed QSOs under extreme weak-signal conditions.

JT4, **JT9**, **and JT65** use nearly identical message structure and source encoding (the efficient compression of standard messages used for minimal QSOs). They use timed 60-second T/R sequences synchronized with UTC. **JT4** and **JT65** were designed for EME ("moonbounce") on the VHF/UHF/microwave bands. **JT9** is optimized for the MF and HF bands. It is about 2 dB more sensitive than **JT65** while using less than 10% of the bandwidth. **Q65** offers submodes with a wide range of T/R sequence lengths and tone spacings; it is highly recommended for EME, ionospheric scatter, and other weak signal work on VHF, UHF, and microwave bands.

FT4 and **FT8** are operationally similar but use T/R cycles only 7.5 and 15 s long, respectively. **MSK144** is designed for Meteor Scatter on the VHF bands. These modes offer enhanced message formats with support for nonstandard callsigns and some popular contests.

FST4 and **FST4W** are designed particularly for the LF and MF bands. On these bands their fundamental sensitivities are better than other WSJT-X modes with the same sequence lengths, approaching the theoretical limits for their rates of information throughput. **FST4** is optimized for two-way QSOs, while **FST4W** is for quasi-beacon transmissions of **WSPR**-style messages. **FST4** and **FST4W** do not require the strict, independent time synchronization and phase locking of modes like EbNaut.

WSPR mode implements a protocol designed for probing potential propagation paths with low-power transmissions. **WSPR** is fully implemented within *WSJT-X*, including programmable "band-hopping".

Latest General Availability (GA) releases: *WSJT-X 2.7*

WSJT-X 2.7 introduces a new program called *QMAP*, new Special Operating Activities Q65 Pileup and SuperFox mode, an option to Update Hamlib at the click of a button, a new program feature Message System, and a number of other enhancements and bug fixes.

Changes from earlier versions, and in particular from version 2.6.1, are described in the Release Notes.

If you will use the Q65 mode, please read the Quick-Start Guide to Q65. On Windows platforms, *WSJT-X 2.7* also includes *MAP65 3.0*, a wideband polarization-matching tool intended for EME. If you will use *MAP65*, be sure to read the Quick-Start Guide to WSJT-X 2.5.0 and MAP65 3.0

Versions of *WSJT-X* labeled with a "-rcx" suffix, for example *WSJT-X* v2.2.0-rc6, are Release Candidates sometimes offered temporarily for beta testing purposes. You should upgrade to the GA release when it becomes available. The -rc# program versions are not suitable for long-term general use.

Installation packages for *WSJT-X 2.7*

Windows:

- Version 2.7.0, 32-bit: wsjtx-2.7.0-win32.exe. (Windows 7 and later)
- Version 2.7.0, 64-bit: wsjtx-2.7.0-win64.exe. (Windows 7 and later)

Linux:

Installation instructions for Linux can be found here in the User Guide. Download the package file appropriate for your system, from the list below. (Versions installable with "apt-get" and "yum" will be made available as soon as our package maintainers create the packages.)

- Version 2.7.0
  - Debian, Ubuntu 22 and 24, ... (64-bit): wsjtx_2.7.0_amd64.deb
  - Fedora 34, RedHat, ... (64-bit): wsjtx-2.7.0.x86_64.rpm
  - Raspberry Pi OS Bullseye, ARMv6, ... : wsjtx-2.7.0_armhf.deb
  - Raspberry Pi OS Bookworm, arm64 (64-bit): wsjtx-2.7.0_arm64.deb

Note: these packages are unlikely to install properly on Linux distributions with required dependencies at lower versions than those on the named distributions. In such cases building from source is the correct way to install *WSJT-X*.

Macintosh macOS:

Installation instructions for version 2.7.0 can be found here in the User Guide.

- Version 2.7.0 for macOS 10.13 through 15: wsjtx-2.7.0-Darwin.dmg

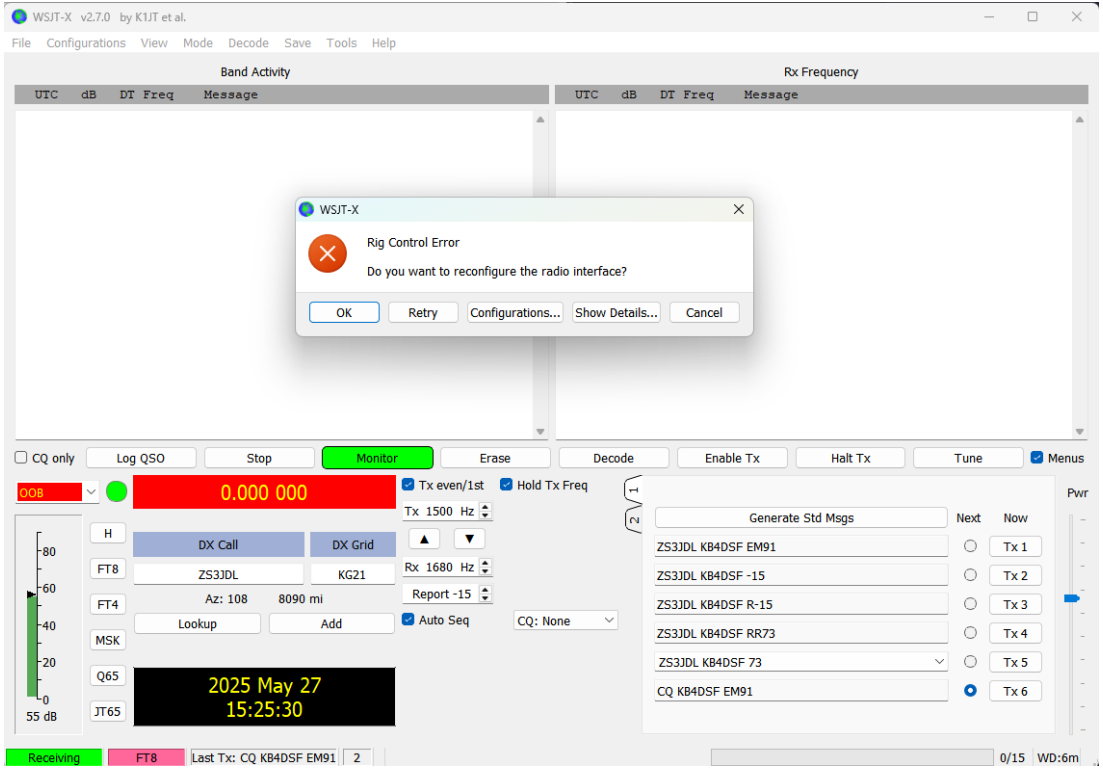
Source Code:

WSJT-X is licensed under the terms of Version 3 of the GNU General Public License (GPL). Development of this software is a cooperative project to which many amateur radio operators have contributed. If you use our code, please have the courtesy to let us know about it. If you find bugs or make improvements to the code, please report them to us in a timely fashion.

Build and installation instructions are in the INSTALL file inside the tarball.

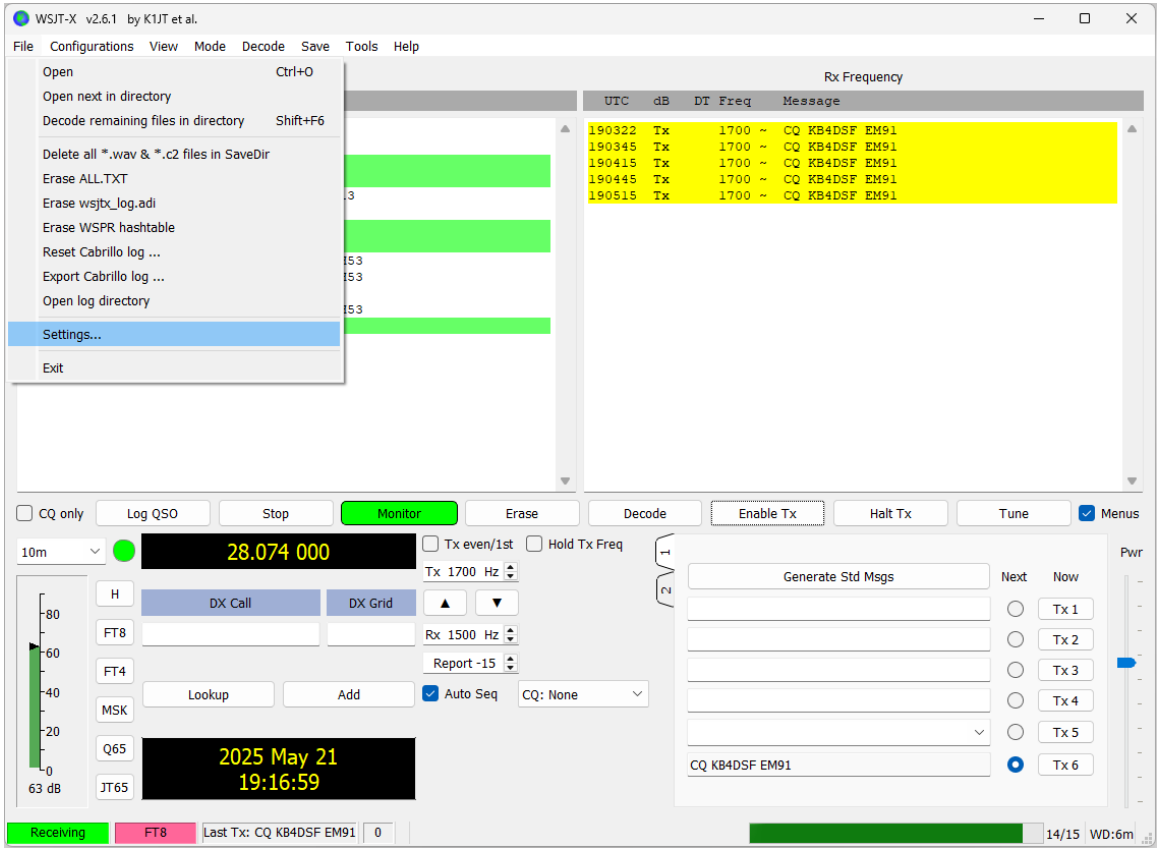
- Source code and necessary resources for *WSJT-X 2.7.0*: wsjtx-2.7.0.tgz

WSJT-X


WSJT-X v2.7.0 by K1JT et al.
File Configurations View Mode Decode Save Tools Help
Band Activity
UTC dB DT Freq Message
Rx Frequency
UTC dB DT Freq Message
WSJT-X
Rig Control Error
Do you want to reconfigure the radio interface?
OK Retry Configurations... Show Details... Cancel
CQ only Log QSO Stop Monitor Erase Decode Enable Tx Halt Tx Tune Menus
0.000 000
Tx even/1st Hold Tx Freq
Tx 1500 Hz
Rx 1680 Hz
Report -15
Auto Seq
CQ: None
DX Call DX Grid
ZS3JDL KG21
Az: 108 8090 mi
Lookup Add
H FT8 FT4 MSK Q65 JT65
55 dB
2025 May 27
15:25:30
Generate Std Msgs Next Now
ZS3JDL KB4DSF EM91 Tx 1
ZS3JDL KB4DSF -15 Tx 2
ZS3JDL KB4DSF R-15 Tx 3
ZS3JDL KB4DSF RR73 Tx 4
ZS3JDL KB4DSF 73 Tx 5
CQ KB4DSF EM91 Tx 6
Pwr
Receiving FT8 Last Tx: CQ KB4DSF EM91 2
0/15 WD:6m

WSJT-X

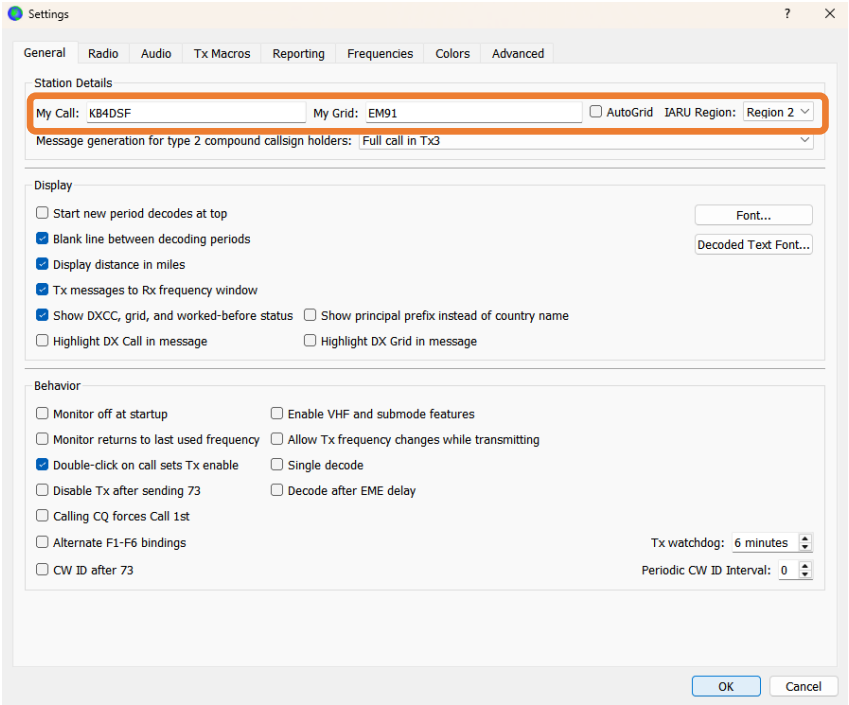
- File→Settings



WSJT-X

- Set callsign
- Set grid square
  - https://www.levinecentral.com/ham/grid_square.php
- Set IARU Region
  - Region 2 for the Americas
  - https://www.iaru.org/about-us/organisation-and-history/regions/
- Other settings are optional

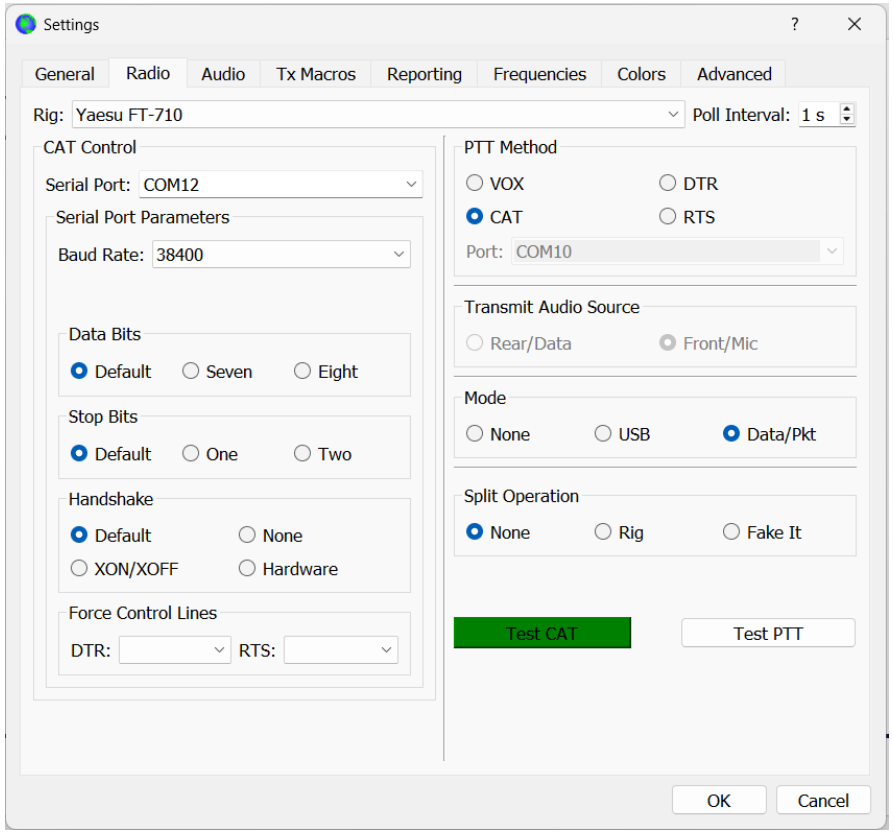
General Tab



WSJT-X

- Select your rig
- Determine serial port and baud rate
- PTT method
  - Rig internal soundcard = CAT
  - Signalink USB = VOX
- Mode
  - USB or Data/Pkt depending on rig
- Test CAT

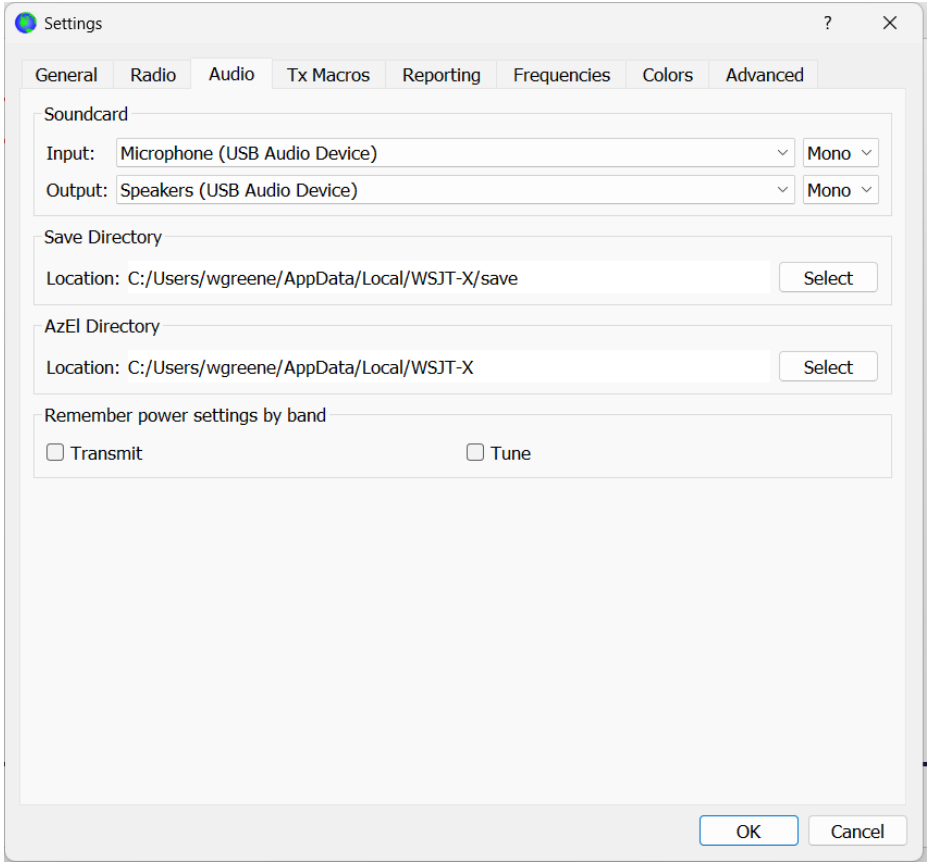
Radio Tab



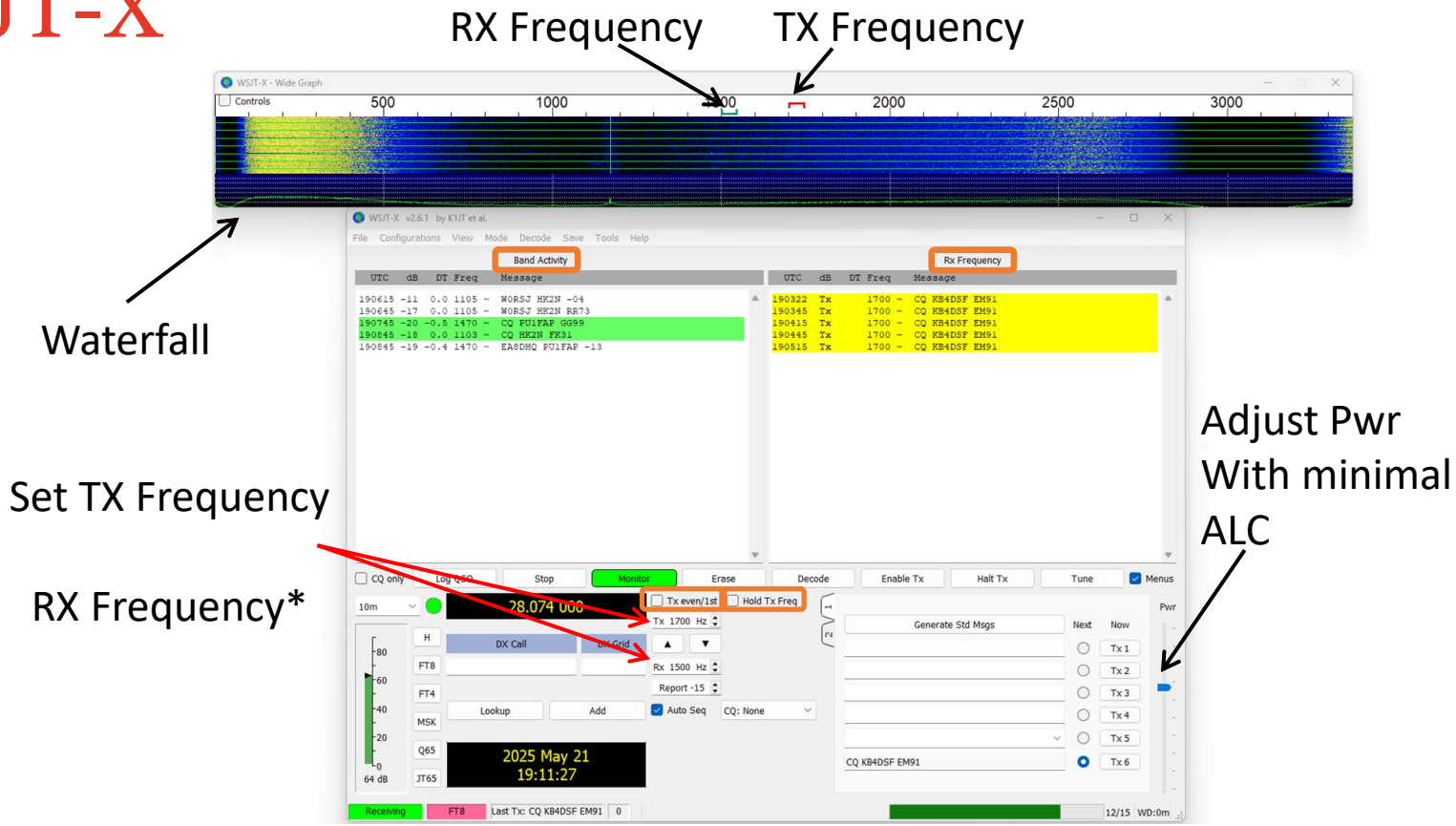
WSJT-X

- Select soundcard
  - Input and Output

Audio Tab



WSJT-X


RX Frequency
TX Frequency
Waterfall
Set TX Frequency
RX Frequency*
Adjust Pwr
With minimal
ALC
Band Activity
Rx Frequency
Tx even/1st
Hold Tx Freq
Tx 1700 Hz
Rx 1500 Hz
Report -15
Auto Seq
CQ: None
Generate Std Msgs
2025 May 21
19:11:27

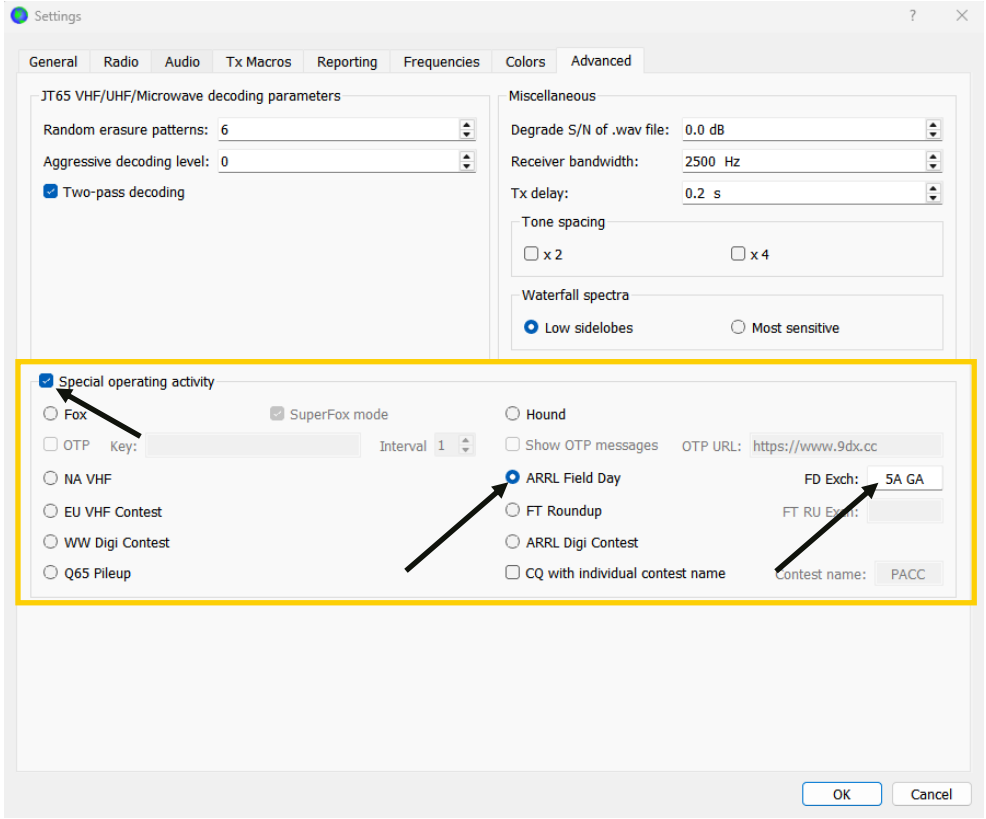
Live Demonstrations

Field Day Setup

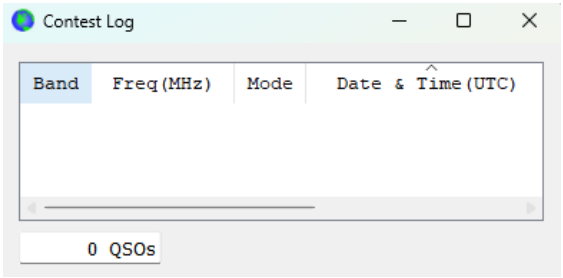
WSJT-X

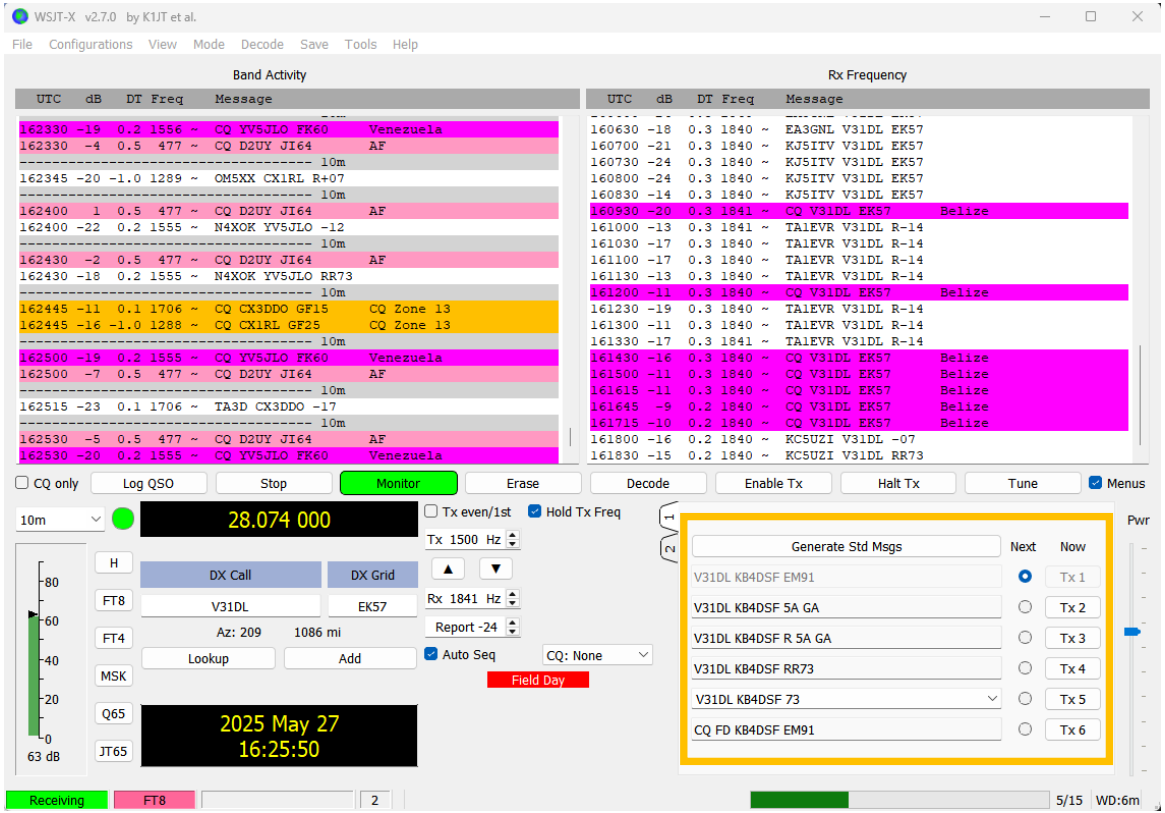
File→Settings→Advanced

- Field Day setup
  - Field Day exchange consists of operating class and ARRL section
- ARRL sections, https://www.arrl.org/sections
  - Look up by state
- Class consists of number of simultaneous transmitters and category
- ARRL Field Day rules, https://www.arrl.org/field-day-rules



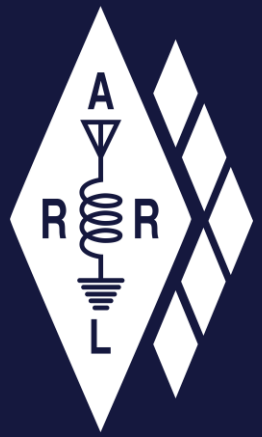
WSJT-X


Contest Log
Band
Freq(MHz)
Mode
Date & Time(UTC)
0 QSOs


WSJT-X v2.7.0 by K1JT et al.
File Configurations View Mode Decode Save Tools Help
Band Activity
Rx Frequency
UTC dB DT Freq Message
CQ only
Log QSO
Stop
Monitor
Erase
Decode
Enable Tx
Halt Tx
Tune
Menus
10m
28.074 000
Tx even/1st
Hold Tx Freq
Tx 1500 Hz
Rx 1841 Hz
Report -24
Auto Seq
CQ: None
Field Day
H
FT8
FT4
MSK
Q65
JT65
DX Call
DX Grid
V31DL
EK57
Az: 209
1086 mi
Lookup
Add
2025 May 27
16:25:50
63 dB
Generate Std Msgs
Next
Now
V31DL KB4DSF EM91
V31DL KB4DSF 5A GA
V31DL KB4DSF R 5A GA
V31DL KB4DSF RR73
V31DL KB4DSF 73
CQ FD KB4DSF EM91
Tx 1
Tx 2
Tx 3
Tx 4
Tx 5
Tx 6
Pwr
Receiving
FT8
5/15
WD:6m

Next Month On the Air Live
June 24 @8pm Eastern
Fox Hunting

Thank You!



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